Remarks:

Claims 1-9, 11-12, 19-26, 29-30, 41-52 are pending, as claims 10, 13-18, 27-28, and 31-40 were canceled by a previous Preliminary Amendment. The Office Action dated August 10, 2005 objected to two paragraphs of the specification for formalities, which are addressed at page 2 of this paper in accordance with the Examiner's suggestions. The Office Action further objected to claims 4, 7-8, 11-12, 22, 25-26, 29, 46, 49-50 and 52 as depending from a rejected base claim but otherwise reciting allowable subject matter. The Office Action rejected claims 1-3, 5-6, 9, 19-21, 23-24, 30, 41-45, 47-48, and 51 under 35 USC 103(a) as being obvious over Olszewski (US 2003/0223354) in view of Maltsev (US 2005/0152466). Of the rejected claims, claims 1, 19 and 43 are independent.

Claims 1, 19 and 43 are amended to recite that N and G are integers greater than one. Claims 7, 25 and 49 are amended to stipulate a "first" switching threshold for increased clarity. Neither of these is done for reasons related to patentability, and equivalents are retained.

Claim 4 is re-written as an independent claim, but does not incorporate the subject matter of claim 3. Claim 3 is amended to depend from claim 4. Similarly for re-written claim 11 (not incorporating intervening claim 9), claim 22 (not incorporating intervening claim 21), claim 29 (not incorporating intervening claim 20), and claim 45 (not incorporating intervening claim 45). The patentability seen in the Examiner's ruling of allowability for these claims is seen to lie regardless of the subject matter of those previously intervening claims, which are herein amended to depend from their associated re-written claim. Other claims are amended to change dependency in view of the above amendments. Note that claims 1, 4, 11 and 43 no longer recite MC-CDMA or spread spectrum.

In view of the Office Action and amendments made herein, claims 3-4, 7-9, 11-12, 20-23, 25-26, 29, 45-47, 49-50, and 52 are allowable given the previous ruling of allowability.

The Office Action rejects independent claims 1, 19 and 43 as obvious over Olszewski in view of Maltsev. Olszewski is seen to teach a SINR measurement method for OFDM systems requiring the computation of power spectral densities of the received and other signals. An averaging

scheme is applied to produce quantized measurements of SINR for various groups of the OFDM sub-channels. Maltsev is directed to multi-carrier systems, OFDM being an example, and teaches an heuristic bit/power loading scheme. The Office Action asserts that Olszewski teaches an instantaneous SNR of an equivalent single sub-carrier at paragraphs [0072] and [0093], and that Maltsev teaches using power in a single sub-carrier of a group for resource allocation at paragraph [0029]. The Applicant contends that Olszewski fails to teach or suggest an instantaneous SNR or an SNR for an equivalent single subcarrier, and that Maltsev fails to teach power as a metric to allocate resources.

Claim 1 recites in relevant part:

> determining an instantaneous group SNR that is calculated using an effective channel function for each user in each group of sub-carriers; and
> for each user and in each group of sub-carriers, using the instantaneous SNR of an equivalent single sub-carrier as a metric for resource allocation at the transmitter.

Claims 19 and 43 recite similarly. First, Olszewski is not seen to teach or suggest an instantaneous SNR, but rather stipulates at paragraphs [0058] to [0071] that SINR is derived from a frame-averaged signal power vector that is averaged over a plurality of frames. This is an explicit teaching away from using an instantaneous measurement for the subchannel group $G_i[n]$ for which SINR is calculated because Olszewski averages a power signal over multiple frames. That multi-frame average is further smoothed by the parameters beta (paragraph [0063]) and alpha (paragraph [0069]). The equations and explanatory text at paragraphs [0070] to [0072] of Olszewski also explicitly recite that SINR is derived from an average signal power, so the Olszewski SINR cannot be an instantaneous measure. It is not seen in the teachings of Olszewski how one would derive an instantaneous SNR of an equivalent single sub-carrier from a multi-frame average of signal power for the group. Thus the Olszewski approach is fundamentally different from that recited in claim 1. To modify Olszewski to use an instantaneous sub-channel specific parameter would appear to change its principle of operation. See for example paragraph [0031] of Olszewski, describing difficulties with burst and

nonstationary interference-plus-noise (IPN) signals that the Olszewski reference seeks to overcome (purportedly by the frame-averaging detailed above).

Second, while the cited paragraphs of Olszewski teach SINR measurement for a group of sub-channels $G_i[n]$, nowhere is it seen that Olszewski uses an equivalent single sub-carrier for each user in each group. Paragraph [0072] of Olszewski recites a quantized SINR measurement for the subchannel group $G_i[n]$, those subchannel groups being part of a subchannel set $G[n]$. Olszewski teaches at paragraph [0029] that different users may be assigned individual or groups of subchannels. Paragraphs [0052] to [0053] recite that subchannel grouping $G[n]$ contains r distinct subchannel groups $G_0[n]$, $G_1[n]$, etc. There is no indication seen that the distinct subchannel groups $G_i[n]$ of Olszewski relate to one user or many, but claim 1 recites that SNR is calculated using an effective channel function *for each user* in each group. The SINR calculations cited in the Office Action at Olszewski's paragraph [0072] yield a quantized SINR for each distinct subchannel group $G_i[n]$ in $G[n]$.

Specifically, Olszewski is not seen to distinguish whether the distinct subchannel groups $G_i[n]$ include one user, more than one user, or if one user's subchannels may span more than one distinct subchannel group $G_i[n]$. If a distinct subchannel group $G_i[n]$ of Olszewski is taken to represent more than one user, then the SINR calculated from $G_i[n]$ at paragraphs [0071] to [0072] of Olszewski necessarily is not for an equivalent single subchannel *for each user* and in each group as recited in claim 1. Olszewski is not seen to disclose that subchannels for only one user are within a distinct subchannel group $G_i[n]$. If a distinct subchannel group $G_i[n]$ of Olszewski is taken to represent only one user, which the Applicant stipulates is not evident or obvious in Olszewski, then the SINR calculated for the distinct subchannel group $G_i[n]$ is not used as a metric for allocating resources, even when combined with Maltsev. Additionally, while Olszewski assembles the various $G_i[n]$'s in a SINR measurement set $\rho[G[n]]$ at paragraph [0072], merely assembling the various SINR measurements $G_i[n]$ into a cohesive set $\rho[G[n]]$ is not a conversion of the SINR's from the distinct subchannel groups $G_i[n]$ into an SNR for an equivalent single sub-carrier for a user of a group as in claim 1.

Since claims 19 and 43 recite similarly to those clauses distinguished above, and Maltsev is neither seen nor asserted in the Office Action to teach relevant to an instantaneous SNR of an equivalent single sub-carrier for each user of each group as in claim 1. The rejection to claims 1, 19 and 43 is seen as overcome.

Claims 1, 19 and 43 exhibit a further distinction over the cited combination of art. The Office Action relies on Maltsev as teaching use of power of a single subcarrier as a metric for resource allocation at the transmitter, citing Maltsev at paragraph [0029]. Note that the assertion concerning Maltsev as rendering a claim 1 element as obvious relies on ordinary skill to substitute Olszewski's purported instantaneous SINR for Maltsev's power as a metric for resource allocation. To the extent that Olszewski fails to teach or suggest instantaneous SNR of an equivalent single sub-carrier (as detailed above), the combination asserted against the final clause of claim 1 must also fail due to this flawed premise.

More directly though, Maltsev is not seen to teach or suggest using power of a single sub-carrier as a metric for resource allocation, as asserted in the Office Action. Typically, power is a resource to be allocated. See for example, the application at paragraph [0029]: "For the explicit use of adaptive modulation and resource allocation of bits *and power*, an analytical expression for the instantaneous SNR of a group of sub-carriers is derived." (emphasis added). Power is not seen to be a metric that can be used to allocate itself, and in fact, Maltsev is not seen to use power to allocate resources but rather, in Maltsev's paragraph [0029] that is referenced by the Office Action, as a resource that is allocated among subcarriers of the active set. While Maltsev may *sort* subcarriers based on effective subcarrier noise power (see Fig. 2), sorting is not analogous to allocating; some (presumably power) allocation has already been applied and only after the subcarrier resources are defined may they be sorted by power. Maltsev is seen to characterize power as a resource to be allocated at paragraph [0033], where a regulating authority is described as setting a maximum power spectral density that acts as a constraint within which the power levels of subcarriers must be set. The asserted combination is seen as flawed because Maltsev does not use power as a metric for resource allocation, so substituting the SINR of Olszewski for the power teachings of Maltsev cannot yield an SNR that is a metric for resource allocation.

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Respecting claims 3 and 45, and as noted above, Olszewski is not seen to teach or suggest a group SNR for a particular user. Neither does Maltsev teach or suggest it. While Olszewski teaches using SNR for a particular subchannel group $G_i[n]$, Olszewski is not seen to describe whether a subchannel group $G_i[n]$ includes the subchannels of only one user or of more than one user, as detailed above.

Respecting claims 5 and 47, the rejection is not understood. In rejecting the base claims 1 and 43, the Examiner characterizes power as being a metric to allocate resources. Claims 5 and 47 recite calculating bit and power allocations. Power cannot be both a metric to allocate power and the resource allocated by the power metric. The argument above is that power is a resource, not a metric. This is how power is seen to be described in Maltsev. Regardless of Maltsev's specific teachings, this rejection is seen as inconsistent with the rejection to claims 1 and 43 from which these claims depend. Even if this rejection is maintained, it is not seen how the Maltsev reference can be applied against claims 1 and 43 by characterizing power as a metric by which resources are allocated, and also against claims 5 and 47 by characterizing power as the resource allocated by itself in claims 1 and 43. As argued above, the characterization of power as asserted against claims 1 and 43 is seen as incorrect.

Respecting claims 9 and 51, Olszewski relates to OFDM, whereas these claims recite spreading with a spreading code associated with a user. Neither Olszewski nor Maltsev is seen to spread and then load into sub-carriers of a user's group. Olszewski's "orthogonal sub-carrier modulator" at cited paragraph [0099] modulates signals onto sub-carriers that are orthogonal to one another. In contradistinction, "orthogonal" spreading codes is a property of the codes themselves, regardless of whether or not the spread codes are later loaded into sub-carriers. The cited portions of Olszewski are seen as largely irrelevant to these claims.
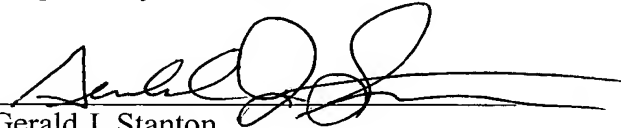
At this time, the Applicant relies on novelty and non-obviousness of claims 1, 19 or 43 to imbue the remaining dependent claims with patentability, but preserves the right to contest, without prejudice, the Office Action's characterization of those claims vis a vis the prior art at a later time should it become necessary.

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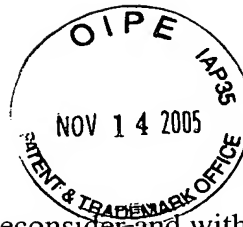
The Applicant respectfully requests that the Examiner reconsider and withdraw the rejections in light of the above arguments and the objections in light of the above claim amendments, and pass each of claims 1-9, 11-12, 19-26, 29-30 and 41-52 to issue. The undersigned representative welcomes the opportunity to resolve any remaining matters that the Examiner deems appropriate via teleconference.

Respectfully submitted:

_____   ___November 8, 2005____
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I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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